SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Aquatic Plant Management in Lake Tohopekaliga and the Kissimmee Chain of Lakes

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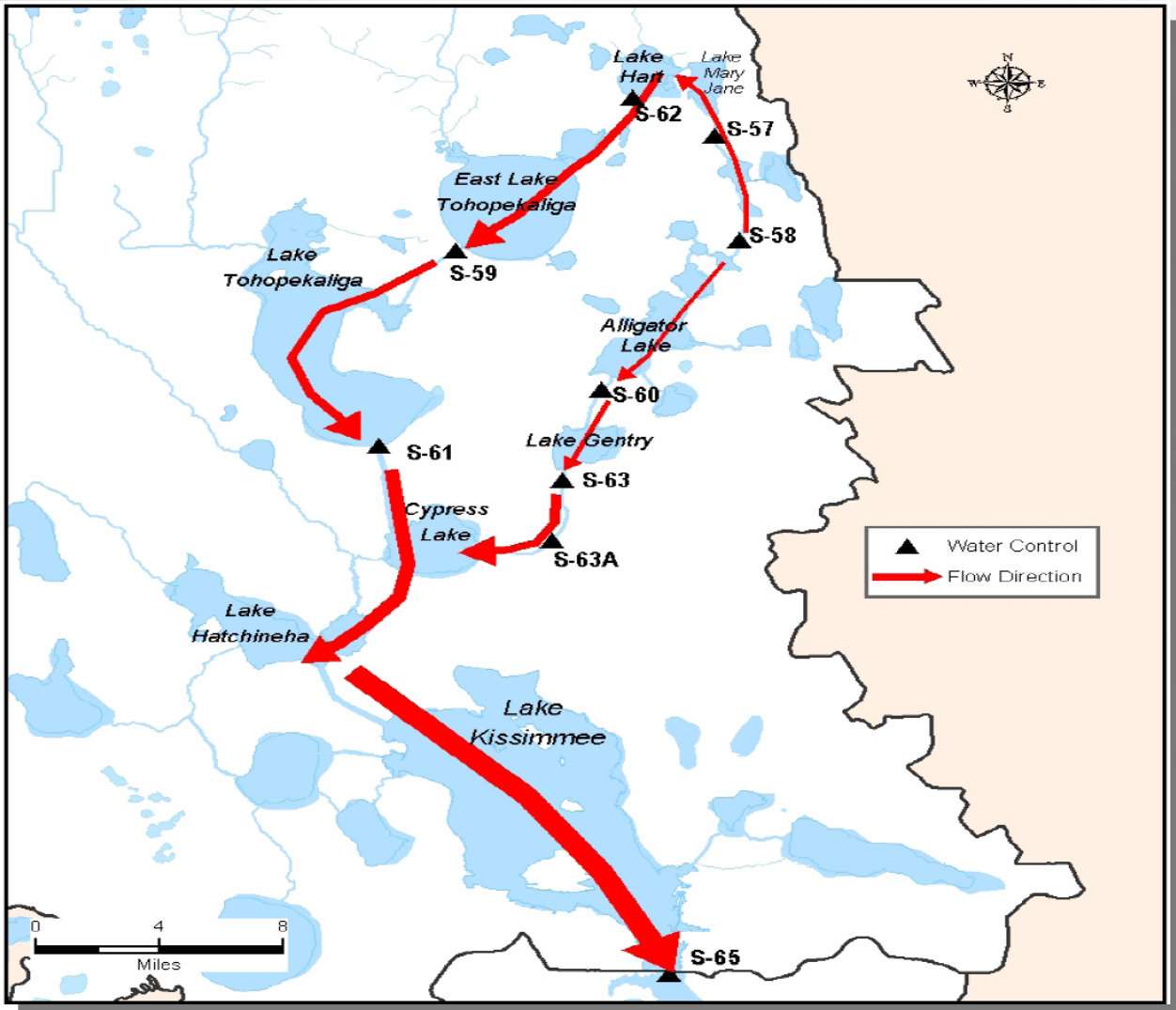
Aquatic Plant Management (APM) in Lake Tohopekaliga and the Kissimmee Chain of Lakes (KCOL)

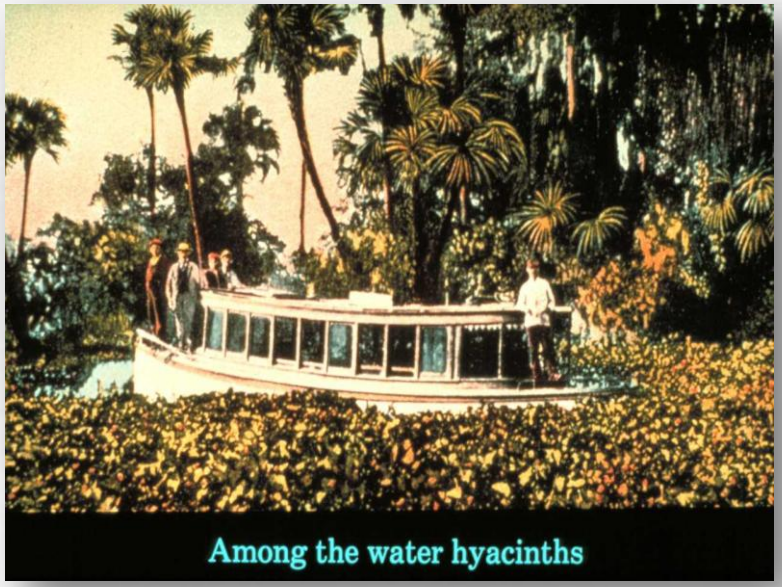
- KCOL $8.5 M local economic impact (2005), 500,000 annual visitors
- 100,000 surface water acres
- Lake Toho (18,000 A) attracts most users
- Fish and Wildlife Comm. (FWC) APM grants prioritize KCOL: flood protection, water management, multi-users, fish and wildlife habitat
- SFWMD is FWC contractor

Kissimmee Chain of Lakes Flows



Water Hyacinth: World's Worst Water Weed

- 1884: Introduced from S. Amer. to Florida
- By late1880s southeastern U.S. water-borne commerce halted
- 1889: Federal Rivers and Harbors Act funding starts – USACE still administers
- 1971: Florida APM Trust Fund created to combat water hyacinth in State waters
- No control from USDA introductions of several biological control insects
- St. Cloud F.S. staff annually treat 7,000 acres on Kissimmee region lakes to maintain control


Among the water hyacinths

Hydrilla

- 1960s - released into Florida from Asia
- Now in 200 Florida public waters – our most widespread aquatic weed
- 85% fewer users when hydrilla covers 80% of Orange Lake, FL (1977)
- No control from several USDA introductions of biological control insects
- Herbicides primary control method

Why Control Water Hyacinth and Hydrilla and Where and When?

Hydrilla jam against bridge

Water hyacinth mat

- Water hyacinth and hydrilla threaten:
  - ✓ Water management, flow capacities and structure integrities
  - ✓ Navigation
  - ✓ Water quality and habitat quality
- Duck hunters want more hydrilla
- Boaters and lake property owners want less hydrilla
- Hydrilla may indirectly benefit snail kites

KCOL Hydrilla Management

LAKE TOHO

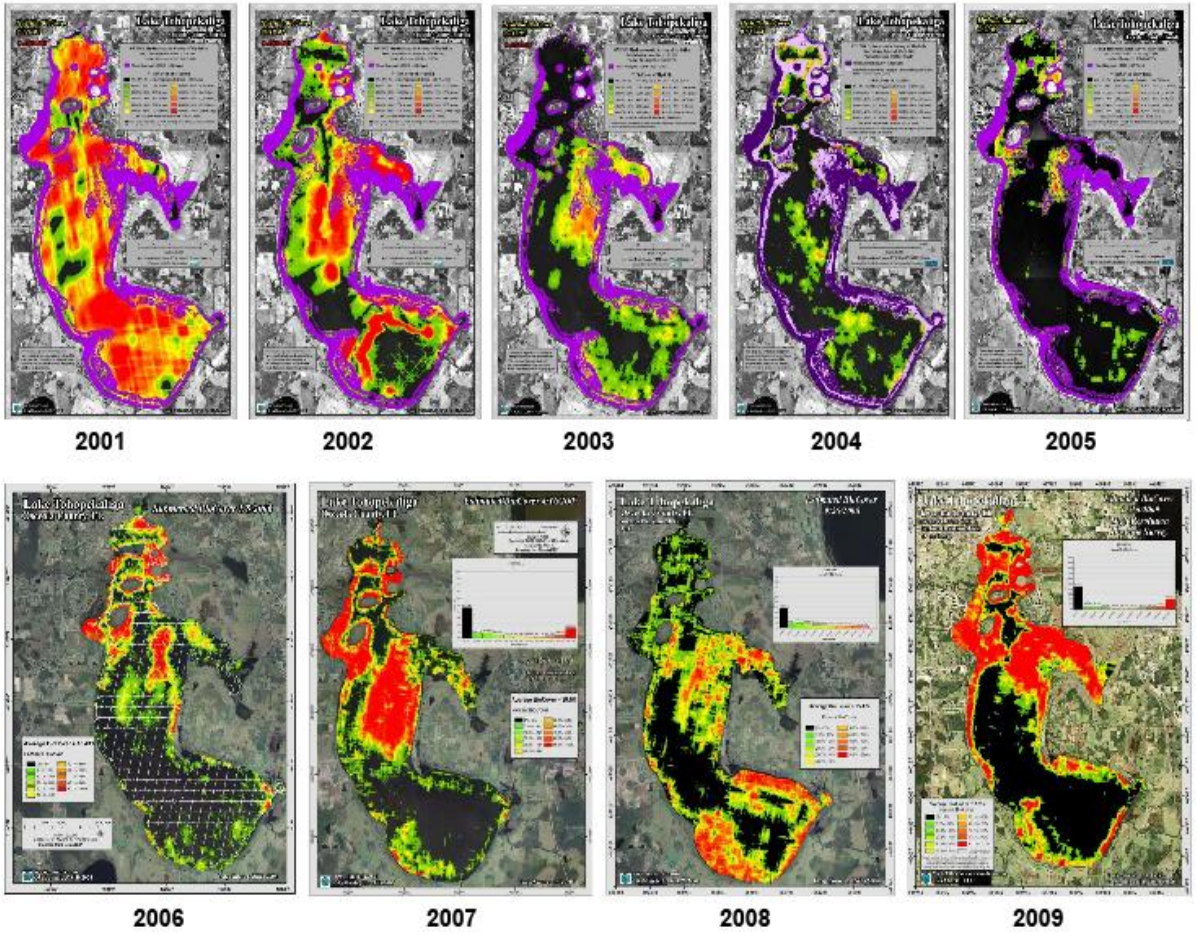
- Today 60% hydrilla coverage - 10,500 acres of 18,000 acre lake
- 2010 – 1,500 acres treated, Snail kite concerns curtailed treatment
- 2009 – 3,200 acres treated
- 2008 – 7000 acres treated – largest treatment on record

LAKES CYPRESS, HATCHINEHA, KISSIMMEE

- Hydrilla treatments continue normally, few or no Snail kites.

Lake Toho Hydrilla Cover

Lake Toho Submersed Plant Cover 2001 - 2009



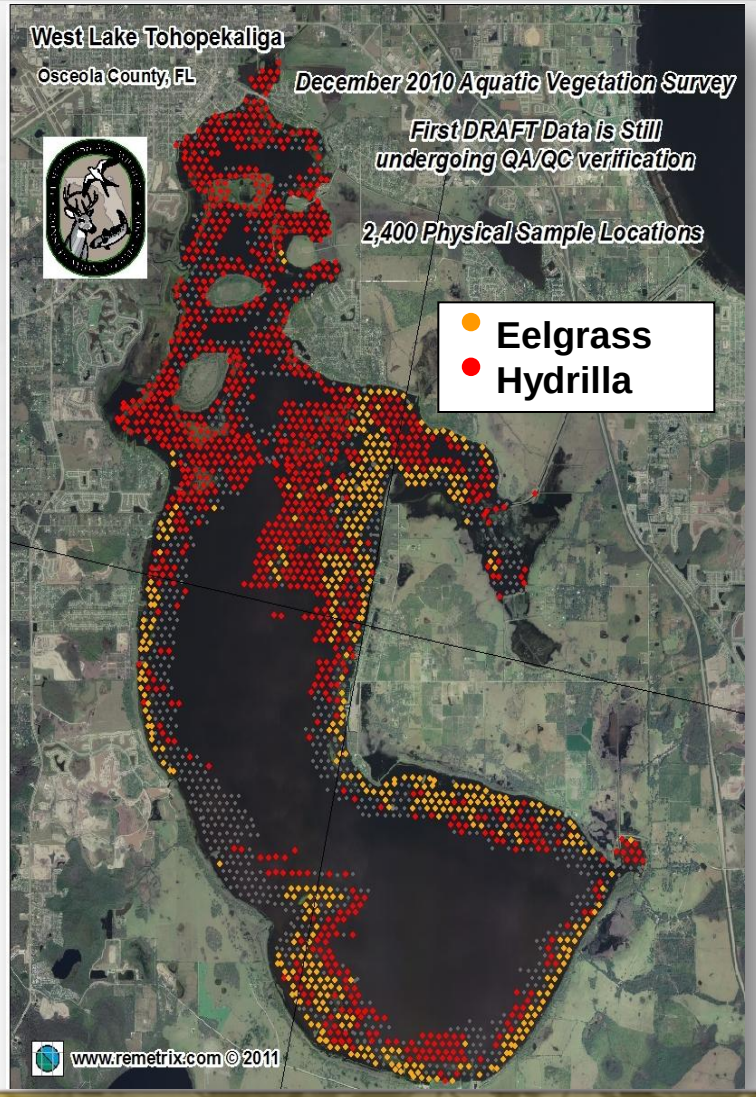
2004 Hurricane Charlie

Biocover of Hydrilla

- Mixed Emergent
- 0-5%
- 5.1-10%
- 10.1-20%
- 20.1-30%
- 30.1-40%
- 40.1-50%
- 50.1-60%
- 60.1-70%
- 70.1-80%
- 80.1-90%
- 90.1-100%

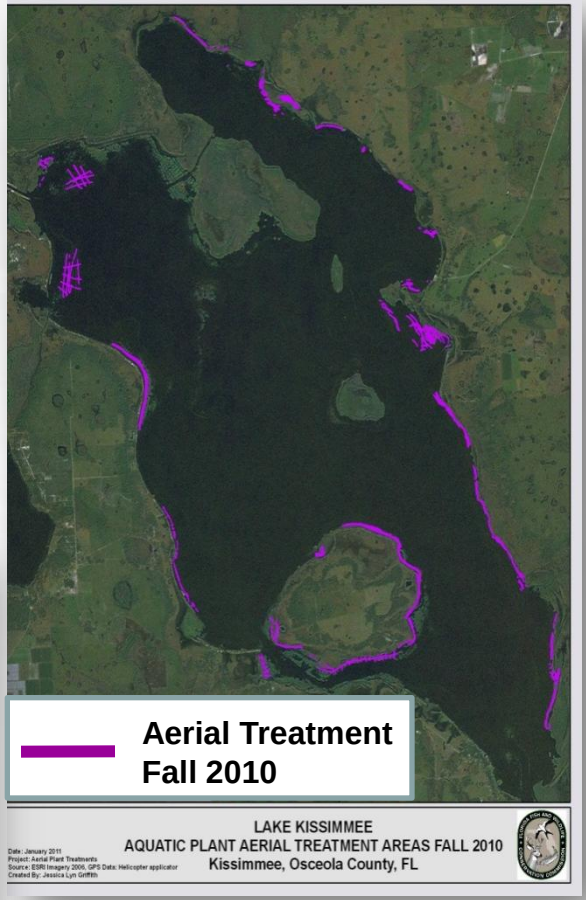
Eelgrass Recovery Since 2004

- **1992–2004**: Fluridone primary FL treatment agent, damages eelgrass
- **2002**: Hydrilla control fails in many public waters
- **2004**: Hydrilla's induced genetic resistance to fluridone proven; UF (W. Haller) efforts bringing new hydrilla herbicides to APM
- **2007**: KCOL hydrilla treatments resume with other herbicides, eelgrass recovery seen



Miscellaneous KCOL Aquatic Plant Management Activities

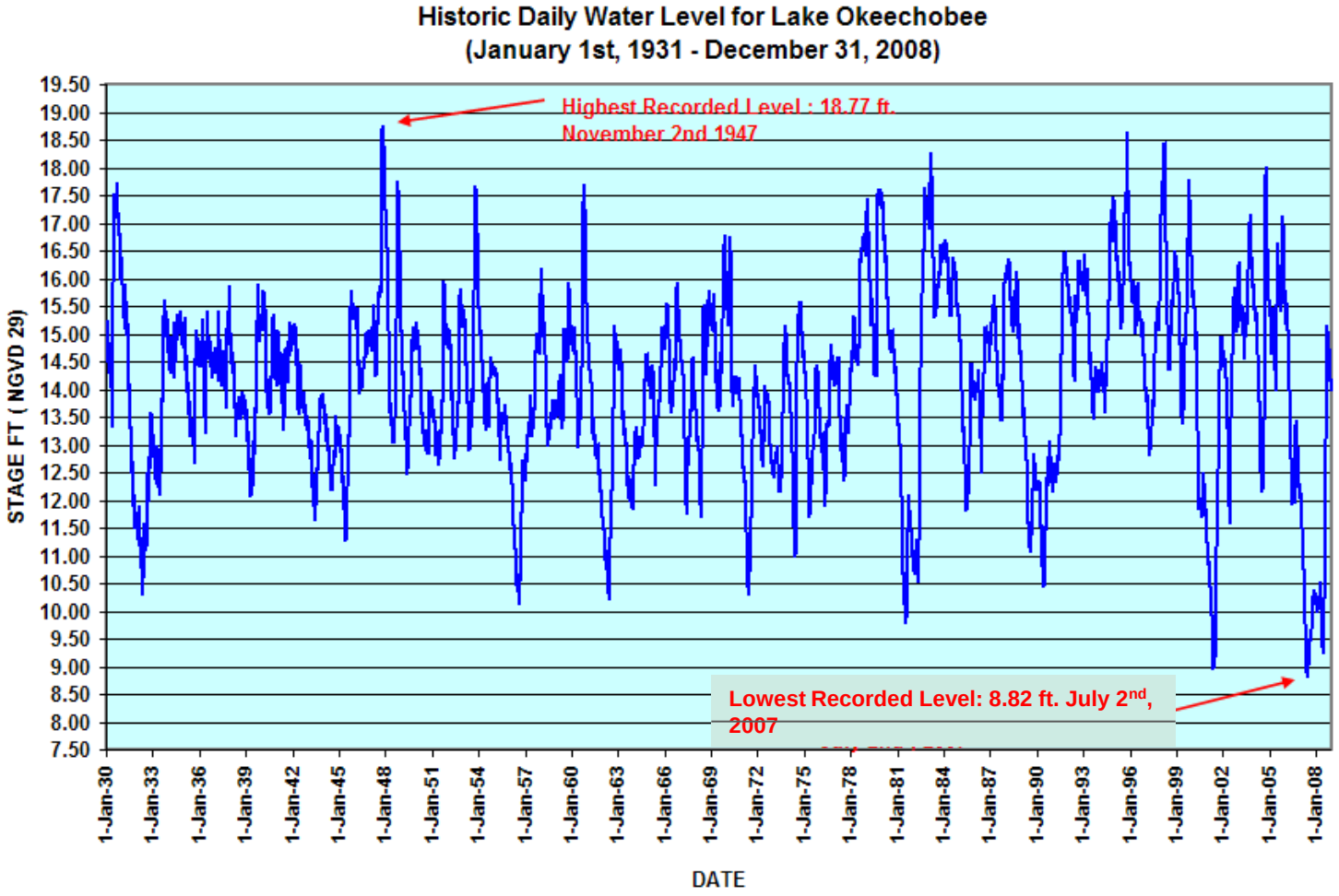
- Historically, very wide water level changes limited native plant growth
- Today, narrow range of water level change allows native plants to overwhelm shallows
- FWC native plant treatments enhance habitat, but broad treatments needed
- Broad treatments concern public



Toho's Importance for Everglade Snail Kites

- Droughts of 2001, 2007 isolate kite populations
- Since 2002 very little nesting in WCAs
- Throughout SFWMD, USFWS kite setbacks are in place
- Since 2002 most snail kites remain on Toho
- Many young fail to survive
- Exotic snails dominant
- Kites and limpkins feed on native and exotic snails
- Hydrilla seems to influence kite nesting/foraging

Lake Okeechobee Lows Stopped Kites North/South Wanderings

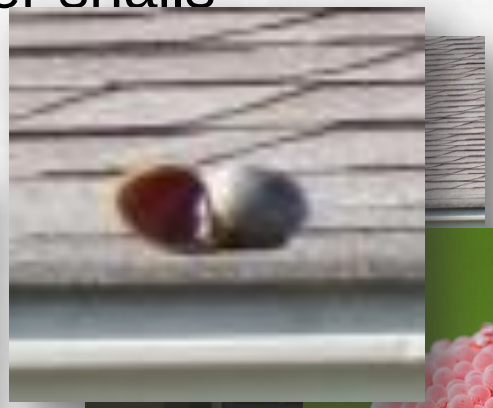


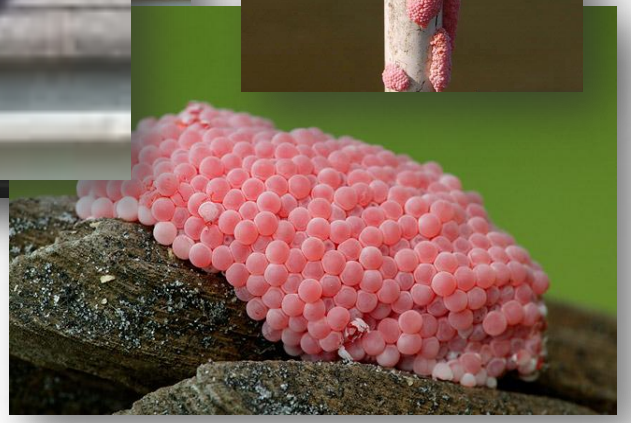
Apple Snails

- Young kites deplete energy stores trying to open larger, stronger exotic snails.
- Island apple snails feed upon other snails leading to domination

Florida apple snail (left) and So. American island apple snail (right).

Florida apple snail egg cluster



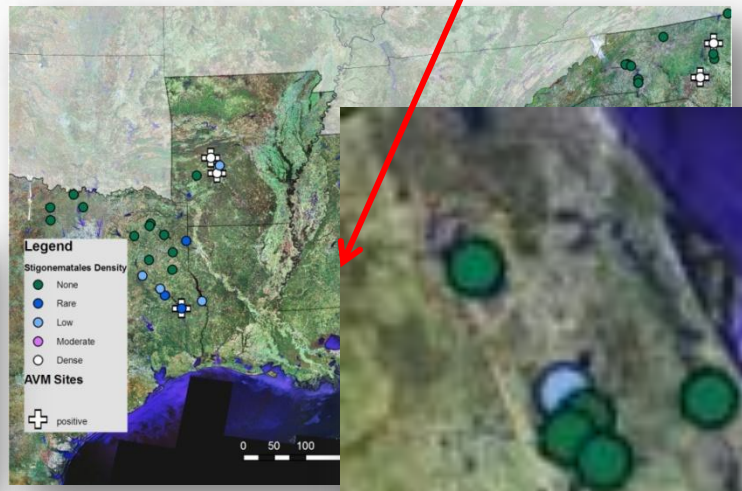


Island apple snail cluster has many more eggs and lays many more clusters.

Stigonematales – "New" Toxic Blue-Green Algae Grows Upon Hydrilla

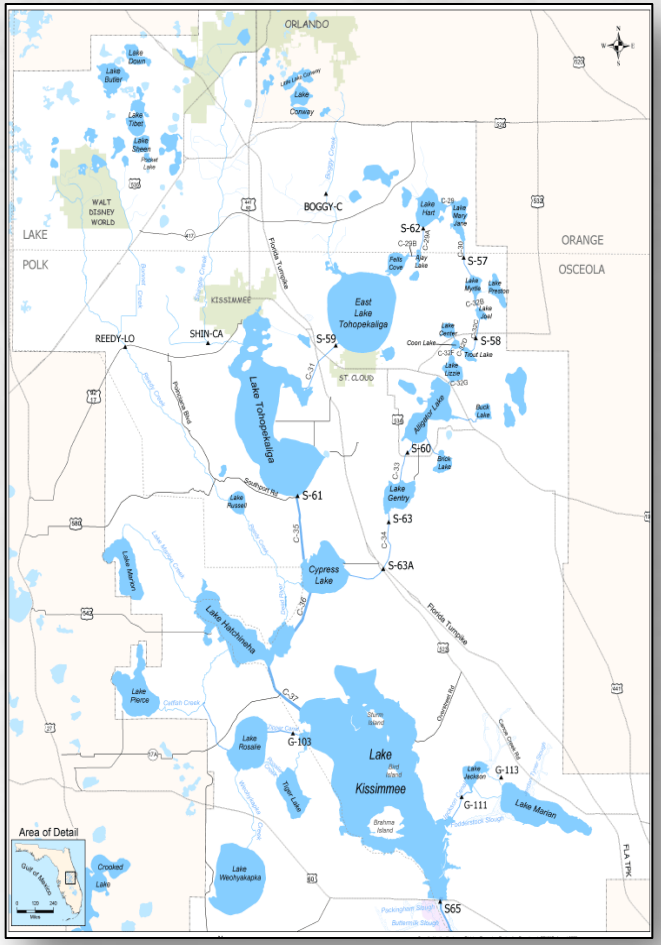
- 1994: Hydrilla-feeding coots in SC develop fatal brain lesions (Avian Vacuolar Myelinopathy, AVM) >100,000 dead
- Coot-feeding bald eagles also develop fatal AVM, 100s dead
- "Stig" now found from TX to NC only upon hydrilla
- Only FL site to date: Toho
- Hydrilla-feeding apple snails, apple snail-feeding kites and limpkins; coots, eagles?

"Stig" growing upon hydrilla



Lake Toho "Stig"

Kissimmee Chain of Lakes Management Issues



- With FWC as lead, continue adaptive and interactive dialogue and planning with involved agencies and public
- Continue keeping water hyacinth at lowest possible levels
- Continue engaging varied stakeholders with varied goals – can't fully please all
- Encourage exotic hydrilla to encourage exotic snails to help endangered species recover?

or

- Control hydrilla to limit threat of new toxic algae growing on hydrilla?